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MEMORANDUM FOR: Economic Defense Intelligence Committee

FROM : Chairman, EDIC

SUBJECT : Supply and Use of Ion Exchange Resins in the Sino-Soviet Bloc

REFERENCE : EDIC Case No. 26, Confidential

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Chairman

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Attachment:
Supply and Use of Ion Exchange Resins in the Sino-Soviet Bloc.

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12 June 1957

SUPPLY AND USE OF ION EXCHANGE RESINS IN THE SINO-SOVIET BLOC

1. Supply Position in the Sino-Soviet Bloc

There is no firm evidence of a shortage of ion exchange resins of any type in the Sino-Soviet Bloc. With the exception of an unconfirmed report regarding the import of an unidentified type of U.S. manufactured ion exchange resin by Hungary through Switzerland in recent years, no known attempts to import these materials from the Free World have been made by the Bloc countries since 1951.

2. Bloc Sources of Supply

East Germany is the principal supplier of these resins for the Bloc, exporting to Poland, Czechoslovakia, USSR, Bulgaria, Hungary, and Rumania. The only other source of supply in the Bloc is the USSR which is producing these resins but probably on a limited scale. Pilot plant production of two types of ion exchange resins, apparently non-strategic type, was begun in Hungary in 1956 but there is no evidence that commercial production has started. There is no evidence of production in any of the other countries of the Sino-Soviet Bloc.

With regard to China specifically, there is no evidence of production and requirements are probably small.

3. Uses of Ion Exchange Resins in the Bloc

At present the principal uses of ion exchange resins in the Bloc appear to be in the field of water purification for industrial applications such as the manufacture of synthetic fibers, pharmaceuticals, synthetic rubber, and the generation of steam for thermal power plants. In September 1956, however, a long technical article was published in Moscow on the "Use of the Ion Exchange Process to Extract, Separate, and Purify Rare Metals," indicating that this strategic application of these resins may now be employed.

4. Additional information on the supply and use of ion exchange resins in the various countries of the Sino-Soviet Bloc is given below:

a. USSR

The USSR has been largely dependent upon imports from East Germany for its supplies of ion-exchange resins. As late as 1955 it was stated that "mass production has not yet been developed" for these materials. However, in September 1956 a long technical article was published in Moscow on the "Use of the Ion Exchange Process to Extract, Separate, and Purify Rare Metals." This article listed some 25 anion and cation "substances" as being of "native derivation." All of the materials were not resins, and there was no indication that they were available in commercial quantities. Only two of the materials, designated as "Espatit-1" and "Espatit-TM" are known to be ion exchange resins, and technical standards have been established for these. If any of the others are ion exchange resins they probably are not of commercial significance at present.

The USSR manufactures a limited amount of styrene, also imports both styrene and ethylbenzene from East Germany. These might become a source of ion exchange resins, however the major consumption of styrene is believed to be for synthetic rubber and for polystyrene. There have been no reports received which identify specific plants as makers of ion exchange resins, nor have any estimates been published on the quantities actually consumed.

As to the use of these resins in the USSR, the principle applications at present appear to be in the field of water purification for high pressure turbine use, and such industrial uses as the manufacture of synthetic fibers, pharmaceuticals, and synthetic rubber. In addition to the technical literature, an article appeared in the Soviet press in 1956 pointing out that ion exchange resins would be used to purify the water used in many of the "virgin lands" regions.

This use could involve large amounts of these materials. There have been no reports of the actual application of these resins to the recovery of uranium or other rare metals, although, as mentioned above, it is evident that the Soviet scientists are aware of the possibilities of this operation.

b. East Germany

Prior to World War II the ion exchange industry in Germany had reached about the same level as the U.S. The I.G. Farben plant at Wolfen was the principal producer. Today, this plant, now called VEB Farbenfabrik Wolfen, is the only known producer of these resins in East Germany. This plant makes hundreds of products, and it was not until 1952 that the production of ion exchange resins started to expand. In 1953 a research chemist was reported to have produced resins on a styrene base. During 1954 and 1955 almost 20 percent of the research funds of the plant was devoted to work on ion exchange resins, and in 1956 a report stated that the resins were being produced by "styrol polymerization with subsequent sulphonisation," as well as "on the basis of phenolsuphonic acid formaldehyde condensation." No information is available on the production of specific types of "Wofatits," (the German trade name for ion exchange resins), and although some fourteen types are listed, none is identified as being based on styrene, although one cationic type is listed as being used for the separation of metals. Following is a table showing the estimated production of "Wofatit resins" for selected years (amounts are in cubic meters; for conversion purposes one cubic meter equals 700 kg, or about 1,500 lbs.).

1950	1951	1952	1954	1956	1957
200	467	1,033	1,300 a/	2,000 a/	2,400 a/

East Germany exports "Wofatits" principally to other Bloc countries. There are no known imports of ion exchange resins. During 1951-54 Poland was the principal importer of these resins from East Germany followed by the USSR, Czechoslovakia, and Hungary. Reported actual and planned exports of "Wofatits" for selected years were as follows (in cubic meters):

1951	1952	1953	1954	1955	1956
331	425	600 b/	850 b/	1,070 b/	1,000 b/

a/ Estimated
b/ Planned

c. Bulgaria

Bulgaria does not produce styrene nor divinyl benzene, and there is no known production of these compounds. Domestic requirements for ion exchange resins are unknown but believed to be small, probably confined to water softening materials.

d. Czechoslovakia

It was reported in 1956 that Czechoslovakia was not producing polystyrene, although the necessary raw materials are available within the country. The only report of interest in this type of ion exchange resins was a mid-1951 request to a U.S. manufacturer for a small quantity of sulphonated cation exchange resin. This order was not filled. Requirements cannot be determined on the basis of available information.

e. Hungary

The Research Institute for Plastics Industry in Hungary has developed nine different methods for producing ion exchange resins. Pilot plant production of two types was started in 1956 at the Kobanya Plastics Plant, but neither of these was a styrene-divinyl copolymer. Prior to the Revolution, plans called for the production of the remaining types, probably including the cross-linked polystyrene variety, to be produced during the Second Five Year Plan. The target dates are likely to be delayed by recent events.

Requirements for ion exchange resins in Hungary are unknown, but are probably significant. At present the total supply is imported, principally from East Germany. According to an unconfirmed report, a special variety, type unidentified, which is made in the U.S. was imported into Hungary through Switzerland in recent years.

f. Poland

Poland has scheduled the production of styrene before the end of 1957, but at present does not produce polystyrene nor any of the ion exchange resins. Current requirements are believed to be small, with supplies coming from East Germany.

g. China

No evidence of production. Requirements small, probably solely for water softening. Requirements probably filled for the most part by domestic natural zeolite production.